PATENT
Attorney Docket No. 213201-00051

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Examiner: Y. Gakh
Loong-Tak LIM, et al.	Group Art Unit: 1743
Serial No.: 09/940,518	
Filed: August 29, 2001	
For: METHOD AND DEVICE FOR TESTING ALDEHYDE IN POLYESTER POLYMER	

Commissioner for Patents
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DECLARATION OF LOONG-TAK LIM
UNDER 37 C.F.R. § 1.132

I, Loong-Tak Lim, a citizen of Canada, residing at 1403-8 Lisa Street, Brampton, Ontario, Canada L6T 4S6, hereby declare and state that:

BACKGROUND

1. I am currently employed as Project Manager by Husky Injection Molding Systems, Ltd., where I am involved in managing preform and bottle prototyping activities in the Bottle Development Center. I received a Ph.D. in Food Science, from the University of Guelph, in Guelph, Ontario, Canada, in 1999.

2. I have reviewed the subject application, including the pending claims, the Office Actions mailed on September 30, 2003 and May 11, 2004, as well as the Journal of Applied Polymer Science article of Villain, U.S. Patent No. 3,645,696 to Iannacone et al., U.S. Patent No. 5,332,548 to Moore, U.S. Public Health Service Publication to Hauser,

U.S. Patent No. 3,649,159 to Cohen et al., EP 0 885 914 A2 to Meier et al., U.S. Patent No. 3,932,126 to Jilla, U.S. Patent No. 4,622,207 to Wang, and U.S. Patent No. 4,946,705 to Manning et al., all of which were cited against the claims of the above-referenced patent application (collectively, the "art of record").

3. The present invention provides a method for measuring acetaldehyde present in a polymer, including the steps of:

providing an airtight container with a seal;

collecting gaseous acetaldehyde emitted by a polymer sample disposed within the airtight container;

sampling gaseous acetaldehyde emitted by the polymer into an airtight syringe;

reacting the gaseous acetaldehyde with an MBTH reagent disposed on an alumina carrier provided within a barrel of the airtight syringe;

contacting the reacted acetaldehyde-reactive reagent with a developer to obtain a detectable response; and

measuring the response to obtain an acetaldehyde reading. (Claim 106).

4. The present invention also provides a method for measuring acetaldehyde present in a polyester polymer, including the steps of:

extracting gaseous acetaldehyde from a polymer into a hermetic headspace;

reacting the gaseous acetaldehyde with an MBTH reagent disposed on an alumina carrier in the hermetic headspace;

contacting the reacted MBTH reagent with an oxidizer solution to obtain a color response; and

measuring the color response to obtain an acetaldehyde reading. (Claim 122).

5. The present invention further provides a method for measuring acetaldehyde present in a polymer, including the steps of:

providing an airtight container having a seal;

collecting gaseous acetaldehyde emitted by a polymer sample disposed within the airtight container;

inserting through the seal of said airtight container a needle having an acetaldehyde-reactive reagent coated on an inert reagent carrier disposed therein, where said needle is provided on an airtight syringe;

extending said acetaldehyde-reactive reagent coated on an inert reagent carrier from within the needle of said airtight syringe into said airtight container;

reacting the gaseous acetaldehyde with the acetaldehyde-reactive reagent in the airtight container;

contacting the reacted acetaldehyde-reactive reagent with a developer to obtain a detectable response; and

measuring the response to obtain an acetaldehyde reading. (Claim 140).

6. The methods of the present invention have been demonstrated to produce unexpectedly superior results in terms of ease of use and test sensitivity, as will be discussed in greater detail below.

7. The MBTH reagent was tested in connection with several different carriers, including (a) adsorptive alumina (80-200 mesh), (b) silica gel sorbent (100-200 mesh), (c) glass fiber pad, (d) polyurethane foam, (e) binder-free polypropylene fiber pad, (f) PVDF membrane, and (g) binder-free polyester fiber pad. Carriers (d), (e), (f), and (g) provided less intensive color development and lower test sensitivity than (a), (b), and (c), and were not tested further.

8. Figure 1 compares the sensitivity of (a) particulate alumina and (c) glass fiber pad test strips containing the MBTH reagent when exposed to acetaldehyde vapor in a hermetically-sealed glass vial. The concentration of the MBTH provided on the

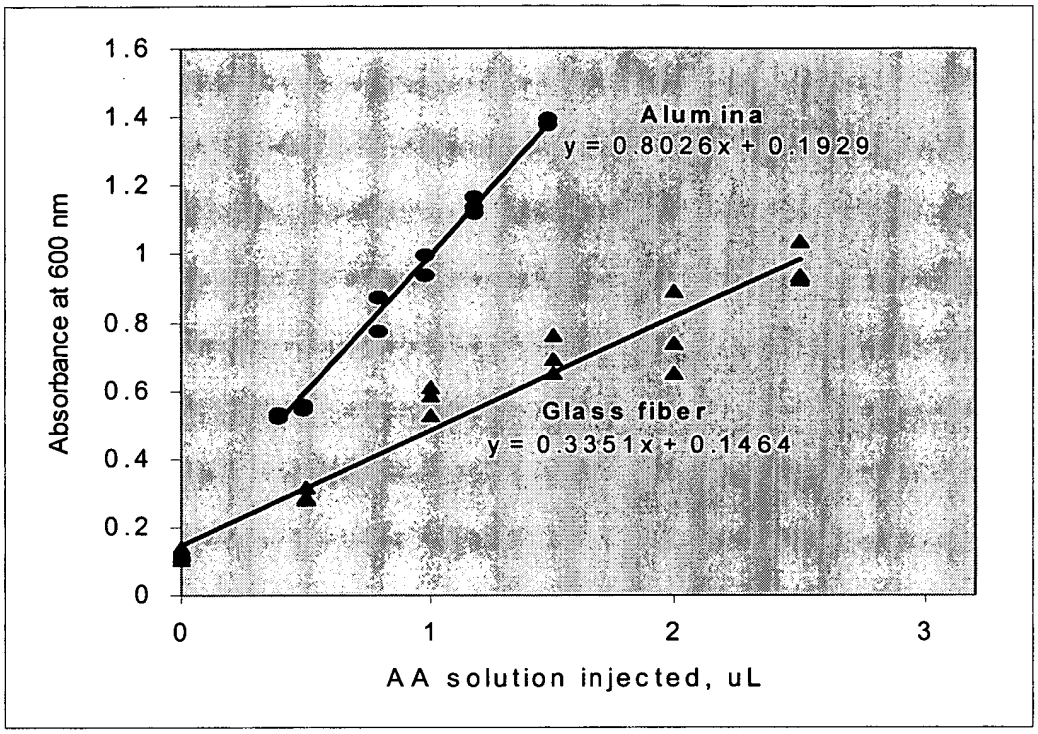

Figure 1

particulate alumina and glass fiber carriers were, respectively, 0.83% (w/v) and 6% (w/v). The acetaldehyde solution used in the test had a concentration of 1000 mg/L. As is seen from the graph, the test strip formed of particulate alumina and MBTH was much more sensitive to the acetaldehyde vapor than the test strip formed of glass fiber pad and MBTH, despite the fact that the glass fiber pad contained a concentration of MBTH that was over seven times greater than the concentration of MBTH present in the particulate alumina carrier.

9. Figure 2 compares the sensitivity of (a) particulate alumina (80-200 mesh) and (b) silica gel (100-200 mesh) test strips containing the MBTH reagent when exposed to acetaldehyde vapor in a hermetically-sealed glass vial. The concentration of the

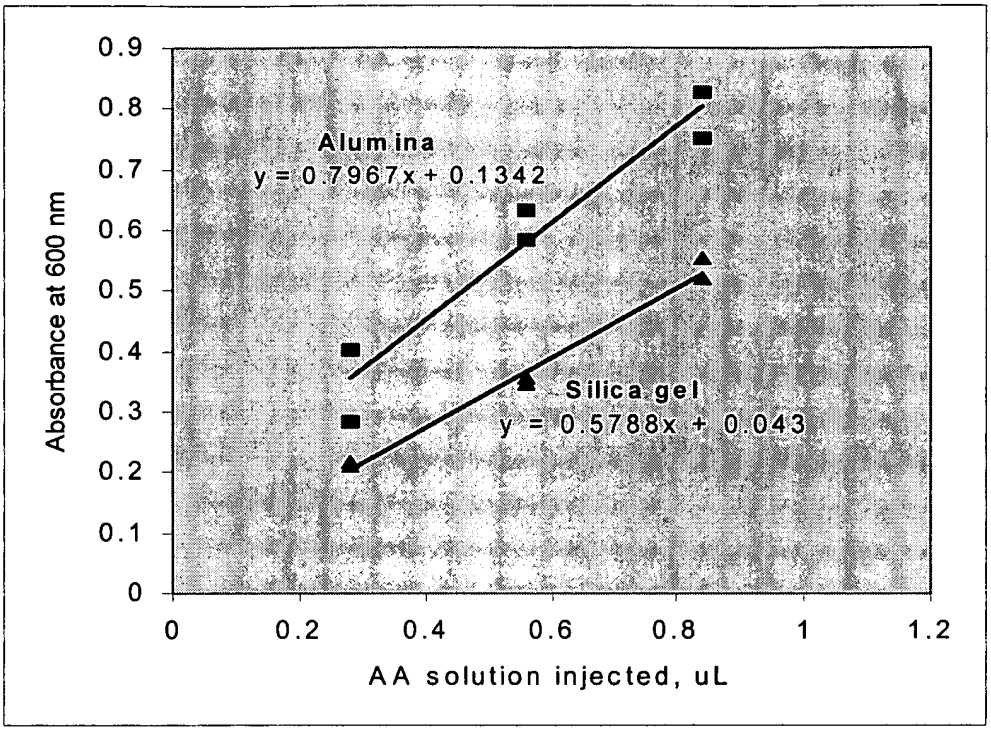

Figure 2

MBTH provided on each of the particulate alumina and glass fiber carriers was 0.83% (w/v). The acetaldehyde solution used in the test had a concentration of 1000 mg/L. As is seen from the graph, at the same MBTH concentration, the test strip formed of particulate alumina and MBTH was also more sensitive than the test strip formed of silica gel and MBTH.

10. None of the art of record in this application discloses the combination of a particulate alumina carrier and MBTH for use in methods of measuring acetaldehyde, as presently claimed. Further, the combination of alumina carrier and MBTH used in certain embodiments of the present invention provides an unexpected result in that the

test methods incorporating a particulate alumina carrier and MBTH reagent are more sensitive for detecting gaseous acetaldehyde than test methods using other carriers with MBTH reagent, as is shown in Figures 1 and 2, above.

11. As shown and described above, the methods in accordance with the present invention provide improved ease of testing and test sensitivity as compared to those employed in the art of record. The art of record does not disclose or suggest the desirable effects of using the combination of MBTH and particulate alumina to perform the claimed methods.

12. I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Loong-Tak LIM

Aug 6, 04

Date